REMARKS

Claims 1-20 are pending herein. Claims 1 and 13 have each been amended and new claims 19 and 20 have been added as supported by paragraph [0057] of the present specification. Attached hereto as pages 7 and 8, pursuant to Rule 1.121(c)(1)(ii), is a marked-up version of the amended claims.

1. Claims 1-18 were rejected under §103(a) over Newkirk et al. To the extent that this rejection might be applied against the amended claims, it is respectfully traversed.

Pending independent claims 1 and 13 each recite processes in which an intermetallic compound-based composite material is produced. While pending claim 1 recites that a metal powder is mixed with a reinforcing material to obtain a mixed powder, pending claim 13 recites that metal and oxide powders are mixed with a reinforcing material to obtain a mixed powder. Each of pending claims 1 and 13 further recite that Al is placed on the upper side of the mixed powder, which has been filled into a reaction vessel, and heated to infiltrate the mixed powder. Pending claims 1 and 13 have each been amended to clarify that the Al and the mixed powder are heated under reduced pressure conditions to a temperature that is several tens of °C higher than the melting point of Al (preferably at least 700°C). The applied prior art of record, discussed below, does not disclose or suggest the heating of the Al and the mixed powder under reduced pressure limitation now recited in pending claims 1 and 13.

Newkirk's method of modifying the properties of a metal matrix while spontaneously infiltrating the metal matrix into a filler material or preform requires a specific infiltration enhancer used in an infiltrating atmosphere. Newkirk discloses that "it is noted that this application, with regard to the spontaneous infiltration technique, discusses primarily aluminum matrix metals which, at some point during the formation of the metal matrix

composite body, are contacted with magnesium, which functions as the infiltration enhancer precursor, in the presence of nitrogen, which functions as the infiltrating atmosphere" (see column 10, lines 56-62). Newkirk further teaches that the term spontaneous infiltration "means the infiltration of the matrix metal into the permeable mass of filler or preform occurs without [the] requirement for the application of pressure or vacuum (whether externally applied or internally created)" (see column 14, lines 55-59).

Applicant respectfully submits that skilled artisans would understand that Newkirk's infiltrating atmosphere provides an atmosphere in which a gas phase reaction between magnesium and nitrogen occurs, and that such a gas phase reaction requires a relatively longer period of time to infiltrate the molten aluminum into the filler or preform material. Please see Example 1 of Newkirk, lines 15-42 for a discussion concerning the length of time required to infiltrate the filler/preform with molten Al using Newkirk's gas phase reaction process.

In contrast to Newkirk, as explained above, pending independent claims 1 and 13 have each been amended to clarify that the Al and the mixed powder are heated under reduced pressure conditions and in a temperature environment that is several tens of °C higher than the melting point of Al. Heating the Al and the mixed powder under reduced pressure provides for the relatively rapid infiltration of the molten aluminum into the mixed powder to more efficiently produce an intermetallic compound-based composite material. See, for example, present specification page 25, lines 22-27 disclosing that the claimed infiltration process requires about one hour. Applicant respectfully submits that Newkirk does not disclose or suggest a process in which the preform or filler material can be effectively and efficiently infiltrated with molten aluminum in the absence of Newkirk's infiltrating enhancer/atmosphere reaction conditions. Again, Newkirk's reaction process

occurs under atmospheric or normal pressure conditions.

In view of all of the foregoing, reconsideration and withdrawal of the rejection of claims 1-18 under §103(a) over Newkirk et al. are respectfully requested.

If the Examiner believes that contact with Applicant's attorney would be advantageous toward the disposition of this case, the Examiner is herein requested to call Applicant's attorney at the phone number noted below.

The Commissioner is hereby authorized to charge any additional fees associated with this communication or credit any overpayment to Deposit Account No. 50-1446.

Respectfully submitted,

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Date

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1. (Twice Amended) A process for producing an intermetallic compound-based composite material comprising a reinforcing material and an intermetallic compound, comprising the steps of: mixing a metal powder with a reinforcing material to obtain a mixed powder, filling the mixed powder into a vessel, placing Al on an upper side of the mixed powder filled into the vessel, heating the Al and the mixed powder under reduced pressure to a temperature that is several tens of °C higher than the melting point of Al, and impregnating the mixed powder with an Al melt, wherein a spontaneous combustion reaction between the metal powder and the Al melt converts the Al melt into an aluminide intermetallic compound, and the Al melt and the metal powder are used respectively in such amounts that a mass ratio of a remaining Al after the spontaneous combustion reaction to the intermetallic compound-based composite material is within a range from 0:10 to 3:7.

13. (Twice Amended) A process for producing an intermetallic compound-based composite material comprising a reinforcing material and an intermetallic compound, comprising the steps of: mixing a metal powder and an oxide powder reducible by Al with a reinforcing material to obtain a mixed powder, filling the mixed powder into a vessel, placing Al on an upper side of the mixed powder filled into the vessel, heating the Al and the mixed powder under reduced pressure to a temperature that is several tens of °C higher than the melting point of Al, and impregnating the mixed powder with an Al melt, wherein a spontaneous combustion reaction between the metal powder and the Al melt converts the Al melt into an aluminide intermetallic compound, and the Al, the metal powder and the oxide powder are used respectively in such amounts that a mass ratio of a remaining Al

after the spontaneous combustion reaction to the intermetallic compound-based composite material is within a range from 0:10 to 3:7.

VERSION WITH MARKINGS TO SHOW CHANGES MADE
Amended claims